

Service Information

1991 - 11 - 15

VR 91-02

VR200/01
VR201/08/60/65
VR2022/011
VR3011/088
VR305/08
2SB01/08
3SB05/08

Video recording

GB For sets starting from WD code 34, new Single-Chip Signal Electronic system (PMS51/01/02) is introduced to replace the 5V Signal Electronic system (PS,PMS).

D Für Geräte ab WD-Code 34 wird eine neue Single-Chip Signalelektronik (PMS51/01/02) statt der 5V-Signalelektronik (PS,PMS) eingeführt.

F Pour les appareils à partir du code WD 34 une nouvelle électronique signalétique de puce unique est mise en service (PMS51/01/02) au lieu de l'électronique signalétique 5V (PS,PMS).

NL Voor apparaten vanaf WD-code 34 wordt een nieuwe single chip signal electronic (PMS 51/01/02) i.p.v. de 5V-signal electronic (PS,PMS) ingevoerd.

I Per apparecchi a partire dal codice WD 34 viene introdotto un nuovo pannello segnali Single-Chip (PMS51/01/02) invece del pannello segnali (PS,PMS).

E Para aparatos a partir del código WD 34 viene introducido un nuevo panel de señales Single-Chip (PMS51/01/02) en lugar del panel de seales (PS,PMS).

Circuit description PMS51 (Single chip signal electronics)

1.General

The PMS51/xx series are the successors of PS and PMS. Boards with extension /01 are for PAL, /02 are for PAL/SECAM BG.

Heart of the circuit is the IC LA7391A containing all luminance, PAL chroma and SECAM BG chroma circuits in 42 pin shrinked dil case.

The SECAM BG detector is the LA 7311 discriminator.

CCD 1H delay line is the MSM 7403RS with 5V only supply. Minor functions have the AN 3319 S as FM AGC the LM 339 as open collector switch in the luminance video processing and the LM393.

2. Record signal path

2.1 Luminance

Pin 39 is the input of the video signal with about 1Vpp. It is then controlled by an AGC amplifier (adjustment via pin 39, time constants pin 38 and pin 16), passes a 6 dB attenuator, a 3.5 MHz low pass filter, a clamp, some switches in the noise canceller/dropout compensator part and is output via an amplifier on pin 3. The signal then goes to an emitter follower, a low pass filter and a second emitter follower to pin 4.

You have to adjust the E/E Level pot to obtain 0.5Vpp on this pin with a 100% white picture. This is necessary for the right values on pin 34 video out and the values of the white and dark clip levels.

Following the signal on pin 4 now without chrominance components it passes a clamp, a detail enhancer (time constant pin 8), a nonlinear emphasis (time constant pin 7, on/off is controlled by the DC level on pin 7) and the main emphasis with internal white and dark clip (time constants between pin 5 and 6).

The signal then goes via the deviation potmeter to pin 42 of the input of the FM modulator. The FM is then filtered, adjusted by the FM record current pot and goes to the summing stage and the head amplifier.

The loop through path outputs the signal via a feedback clamp and an insert stage (control pin 33) to pin 34 and via an emitter follower to the I/O part of the VCR.

2.2 Chrominance PAL

After the in 2.1 mentioned 6dB attenuator the signal also comes to the 4.43MHz Bandpass filter, an ACC (Automatic Chroma Control time constant pin 14), the main converter, a 1 Mhz low pass filter, a killer stage to pin 15 and via the chroma record current to the summing stage.

The 5.06 MHz for the main converter comes via the 5.06 MHz bandpass filter from the sub converter where 4.43 MHz from the VXO and 627kHz from the Line PLL is mixed.

The Line PLL is locked to the composite sync pulse from the sync separator. It uses a 321 x fH VCO (Loop filter on pin 23 and 24). The frequency is then divided by 8 in 4 different 90 degree shifted phases as it is necessary for the VHS standard. Phase shift control input is pin 41 which is also an SP/LP input.

The Line PLL part also produces the Burst Gate Pulse BGP. The VXO is locked to the incoming burst signal via the record APC detector (Loop filter pin 17).

This IC uses a special crystal for which no adjustment is necessary. An additional frequency doubler with the output on pin 21 supplies the 8.86 MHz for the CCD.

The H/2 frequency is taken from pin 17. It is the information about the phase of chroma for making color inserts on teletext boards possible in the correct phase (option).

2.3 Chrominance SECAM BG

Pin 27 H forces the IC to SECAM BG mode (Phase rotation off, VXO fixed frequency, filter characteristic of bandpass wider).

This information comes from the SECAM BG detector LA 7311 which works automatically in /02 versions.

3. Playback signal path

3.1 Luminance

The FM playback voltage passes the AGC amplifier AN3319S and the FM processing circuit which gives the necessary filter characteristics and is input to pin 39.

The FM then goes to a double limiter stage, a FM demodulator and a sub low pass filter. Pin 3 has a high impedance in play so the connected R/C components act as a linear deemphasis.

Pin 2 allows a correction of frequency response and the adjustment of the Y PB Level. Measuring point for this level is the output pin 34 while you play back a standard 100% white recording.

After correction of the frequency response in the external low pass filter now switched by the LM339 to a slightly different characteristic, the video passes, via pin 4, the 3.5 MHz low pass, the noise canceller and dropout compensator part.

For both functions the 1 H CCD is necessary. Pin 12 supplies the video to the CCD and pin 10 receives the signal where a Voltage Controlled Amplifier VCA adjusts automatically the gain tolerances of the CCD. For this function the capacitor of pin 9 is important.

You can check CCD function by connecting pin 2 to 5V in E/E mode and then measure on pin 32 the difference signal of 2 lines.

After the noise canceller the video passes the nonlinear deemphasis (time constant pin 7 as rec), a noise canceller (time constant pin 8), the picture control stage (controlled by DC on pin 13 2V = soft, 3V = sharp), the Y/Chroma mixing stage and the video output amp to pin 34.

3.2 Chrominance PAL

627kHz Chroma from tape goes through a 1 MHz low pass filter and an amplifier with group delay correction to pin 15 of the IC. The chroma is amplified, controlled in the ACC amplifier, mixed with 5.06 MHz and goes via the 4.43 MHz bandpass and an amplifier to the combfilter where crosstalk components from the neighbor tracks are removed.

The chroma then comes back to the IC at pin 27 where it is amplified, leaves at pin 31 and comes back again at pin 29 via an emitter follower acting as a switch for other chroma systems. Pin 29 is the input of the Y/C mixing stage.

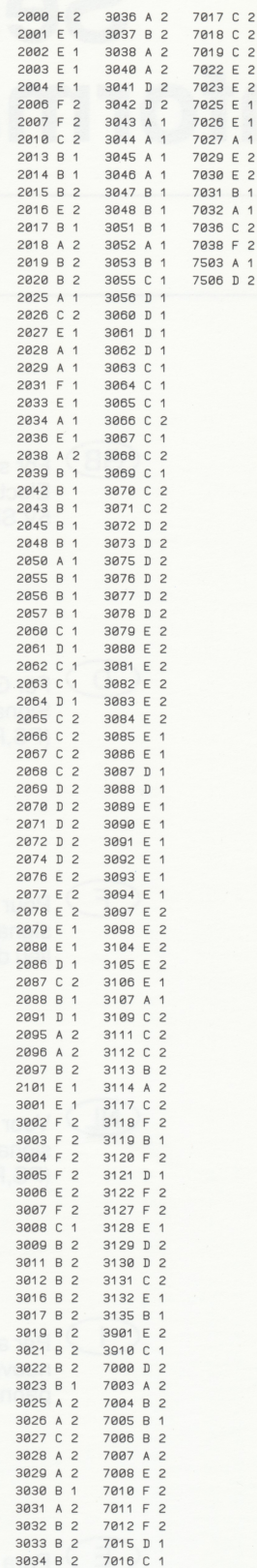
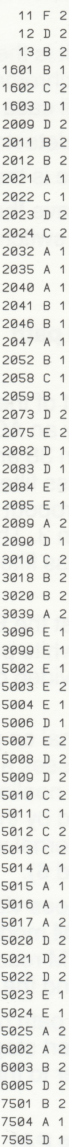
In play the 5.06 MHz frequency is made by the free running 4.43 MHz crystal oscillator and the 321 fH VCO. It is controlled by the PB APC loop, generating a signal from the outgoing burst and the 4.43 MHz of the crystal.

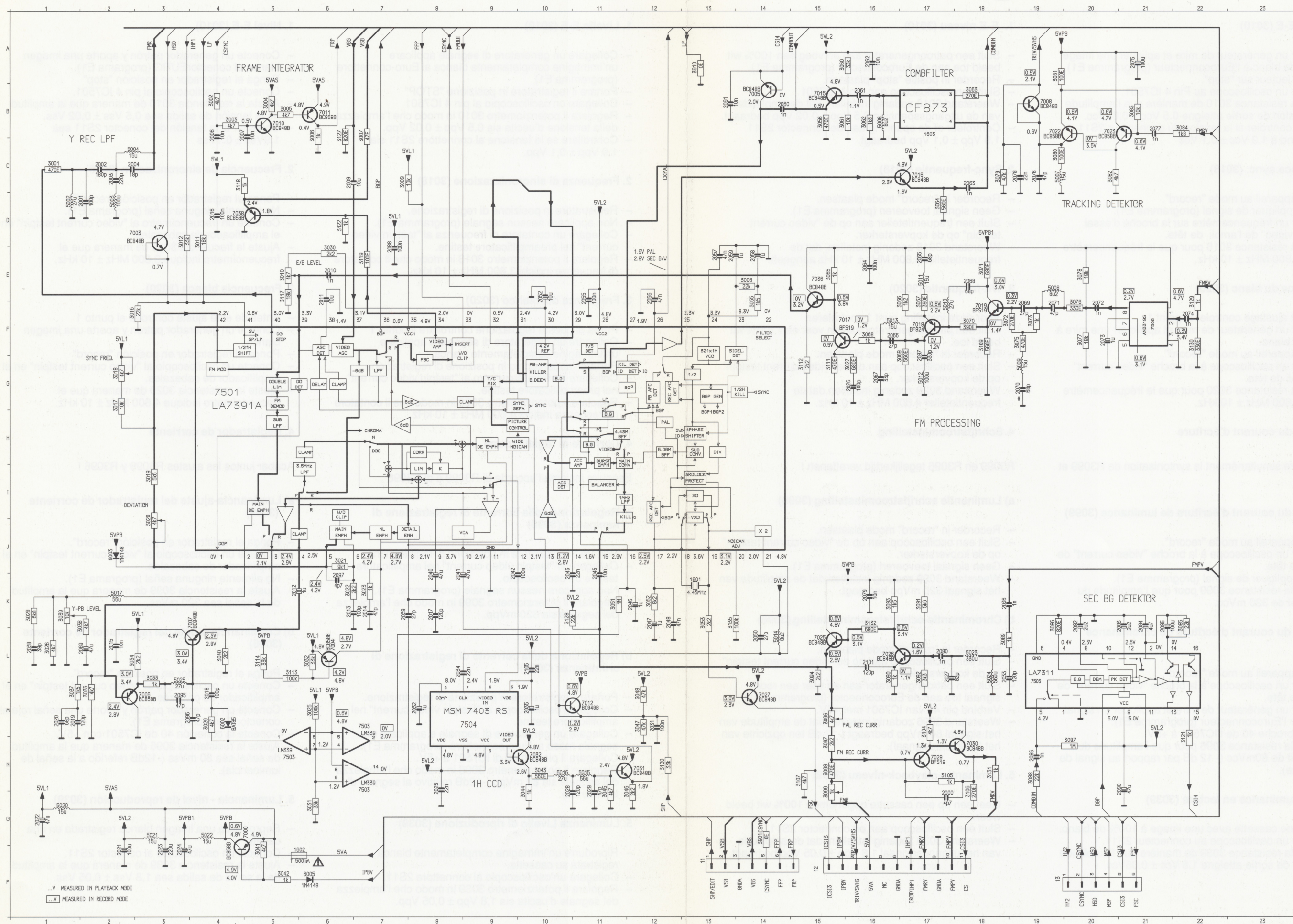
3.3 Chrominance SECAM BG

The signal path is almost the same as in PAL.

Differences are :

- 321 fH VCO locked to sync,
- no phase rotation,
- Comb filter off,
- internal bandpass filter has larger bandwidth,
- no color killer function, color always on.

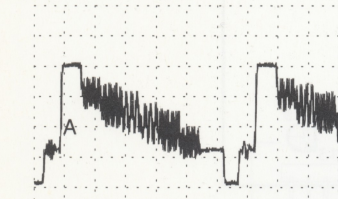




OSCILLOGRAMS SIGNALELECTRONIC

UNLESS OTHERWISE INDICATED MEASURED IN POSITION RECORD

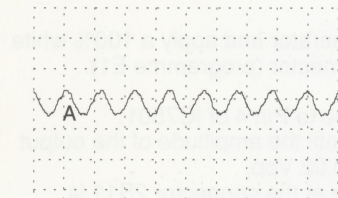
A: DC, 0.5 V/Div, 10 us/Div



← 1.5V

Connector B11 Pin 2
VSB

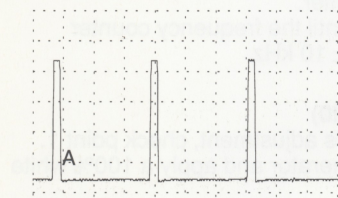
A: DC, 0.5 V/Div, 0.2 us/Div



← 0V

Connector B13 Pin 6
FSC

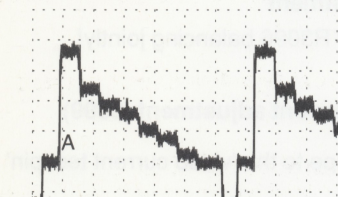
A: DC, 1.0 V/Div, 20 us/Div



← 0V

IC 7501 Pin 32

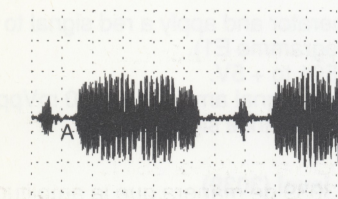
A: AC, 0.1 V/Div, 10 us/Div



← 2V

IC 7501 Pin 10
(Measured in Playback)

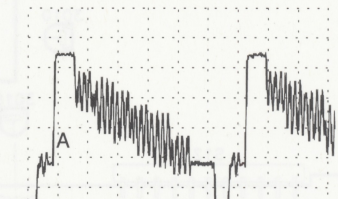
A: DC, 0.5 V/Div, 10 us/Div



← 2V

IC 7501 Pin 25
(Measured in Playback)

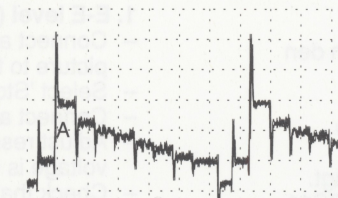
A: AC, 0.2 V/Div, 10 us/Div



← 2V

Connector B11 Pin 4
VBS

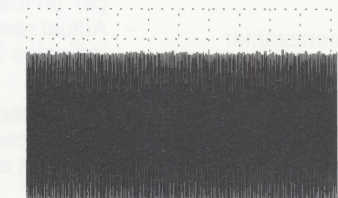
A: DC, 0.2 V/Div, 10 us/Div



← 2V

IC 7501 Pin 5

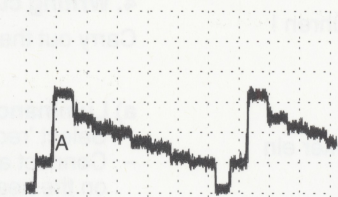
A: AC, 0.2 V/Div, 2 us/Div



← 2.8V

IC 7501 Pin 40

A: AC, 0.1 V/Div, 10 us/Div



← 2V

IC 7501 Pin 12
(Measured in Playback)

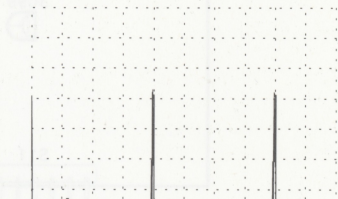
A: AC, 50 mV/Div, 5 ms/Div



← 2V

IC 7501 Pin 27
(Measured in Playback)

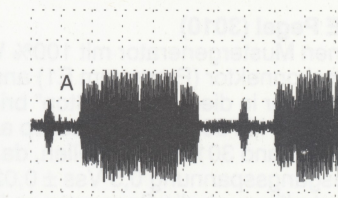
A: DC, 0.5 V/Div, 5 ms/Div



← 0V

Connector B11 Pin 7
FRP

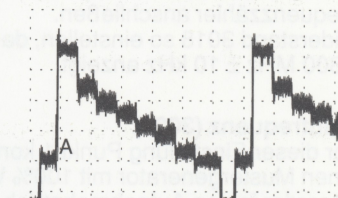
A: AC, 0.1 V/Div, 10 us/Div



← 2.8V

IC 7501 Pin 15

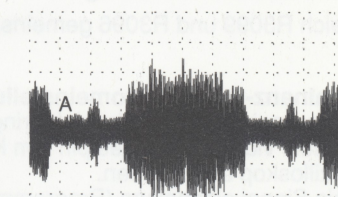
A: AC, 0.1 V/Div, 10 us/Div



← 2.5V

IC 7501 Pin 3
(Measured in Playback)

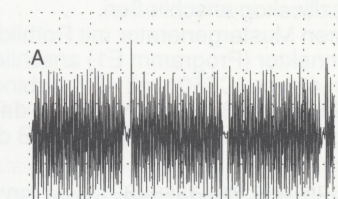
A: AC, 0.2 V/Div, 10 us/Div



← 2.5V

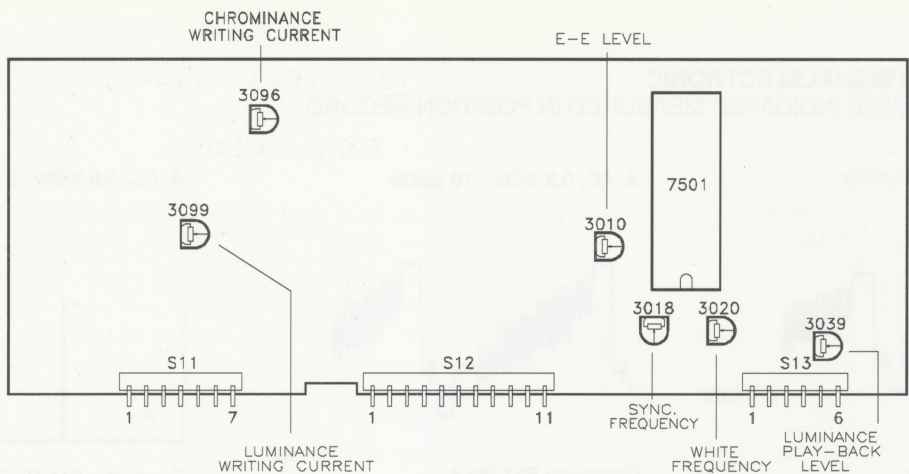
IC 7501 Pin 15
(Measured in Playback)

A: AC, 50 mV/Div, 20 us/Div



← 3V

IC 7501 Pin 39
(Measured in Playback)



D EINSTELLUNGEN

1. E-E Pegel (3010)

- Einen Mustergenerator mit 100% Weißbild an den Eurokonnektor (Programm E1) anschließen.
- Recorder in die Stellung "Stop" bringen.
- An Pin 4 IC7501 ein Oszilloskop anschließen.
- Widerstand 3010 so einstellen, daß die Ausgangsspannung 0,5 Vss \pm 0,02 Vss beträgt.
- Kontrolliere, ob die Spannung an Konnektor 2S11 1,9 Vss \pm 0,1 Vss beträgt.

2. Synchpegelfrequenz (3018)

- Recorder in Aufnahmebetrieb bringen.
- Kein Signal einspeisen (Programm E1).
- An den 'video current testpin' am Kopfverstärker einen Frequenzzähler anschließen.
- Widerstand 3018 so einstellen, daß der Frequenzzähler 3,800 MHz \pm 10 kHz anzeigt.

3. Weißfrequenz (3020)

- Vor dieser Einstellung Punkt 1 kontrollieren.
- Einen Mustergenerator mit 100% Weißbild anschließen.
- Recorder in den Aufnahmebetrieb bringen.
- An den 'video current testpin' am Kopfverstärker ein Oszilloskop anschließen.
- Widerstand 3020 so einstellen, daß der Frequenzzähler 4,600 MHz \pm 10 kHz anzeigt.

4. Schreibstromeinstellung

Abgleich R3099 und R3096 gemeinsam durchführen !

a) Luminanz-Schreibstromeinstellung (3099)

- Recorder in Aufnahmebetrieb bringen.
- An den 'video current testpin' am Kopfverstärker ein Oszilloskop anschließen.
- Kein Signal einspeisen (Programm E1).
- Widerstand 3099 so einstellen, daß die Amplitude des Signals 320 mVss beträgt.

b) Chrominanz-Schreibstromeinstellung (3096)

- Recorder in den Aufnahmebetrieb bringen.
- An den 'video current testpin' am Kopfverstärker ein Oszilloskop anschließen.
- Einen Mustergenerator mit Rotbild an den Euro-konnektor (Programm E1) anschließen.
- Pin 40 von IC7501 mit +5V verbinden.
- Widerstand 3096 so einstellen, daß die Amplitude des Signals 80 mVss beträgt (-12 dB des Luminanzsignals).

5. Luminanz-Wiedergabepegel (3039)

- Ein aufgenommenes Weißbild wiedergeben.
- An Konnektor 2S11 ein Oszilloskop anschließen.
- Widerstand 3039 so einstellen, daß die Amplitude des Ausgangssignals 1,8 Vss \pm 0,05 Vss beträgt.

GB ADJUSTMENTS

1. E-E level (3010)

- Connect a pattern generator and apply a 100% white picture to the Euroconnector (programme E1).
- Select 'Stop' mode.
- Connect an oscilloscope to Pin 4 of IC7501.
- Adjust resistor 3010 until the amplitude of the output voltage is 0.5 Vpp \pm 0.02 Vpp.
- Check that the voltage at the connector 2S11 is 1.9 Vpp \pm 0.1 Vpp.

2. Sync frequency (3018)

- Select 'record' mode.
- Apply no signal (programme E1).
- Connect a frequency counter to the 'video current test pin' on the head amplifier.
- Adjust resistor 3018 until the frequency counter indicates 3.800 MHz \pm 10 kHz.

3. White frequency (3020)

- Before carrying out this adjustment, check point 1.
- Connect a pattern generator and apply a 100% white picture.
- Select 'record' mode.
- Connect an oscilloscope to the 'video current test pin' on the head amplifier.
- Adjust resistor 3020 until the frequency counter reads 4.600 MHz \pm 10 kHz.

4. Writing current adjustment

Carry out the R3099 and R3096 balancing jointly!

a) Luminance writing current adjustment (3099)

- Select 'record' mode.
- Connect an oscilloscope to the 'video current test pin' on the head amplifier.
- Apply no signal (programme E1).
- Adjust resistor 3099 for a signal amplitude of 320 mVpp.

b) Chrominance writing current adjustment (3096)

- Select 'record' mode.
- Connect an oscilloscope to the 'video current test pin' on the head amplifier.
- Connect a pattern generator and apply a red signal to the Euroconnector (programme E1).
- Connect pin 40 of IC7501 to +5V.
- Adjust resistor 3096 for a signal amplitude of 80 mVpp (-12 dB relative to the luminance signal).

5. Luminance playback level (3039)

- Play a 100% white picture from a cassette.
- Connect an oscilloscope to connector 2S11.
- Adjust resistor 3039 until the amplitude of the output signal is 1.8 Vpp \pm 0.05 Vpp.

F AJUSTAGES

1. Niveau E-E (3010)

- Brancher un générateur de mire et appliquer une image à 100% de blanc à l'Euroconnecteur (programme E1).
- Mettre le lecteur sur "stop".
- Brancher un oscilloscope au Pin 4 IC7501.
- Ajuster la résistance 3010 de manière que l'amplitude de la tension de sortie atteigne 0.5 Vcc \pm 0.02Vcc.
- Veillez à contrôler si la tension du connecteur 2S11 correspond à 1.9 Vcc \pm 0.1 Vcc

2. Fréquence sync. (3018)

- Mettre l'appareil au mode "record".
- Ne pas appliquer de signal (programme E1).
- Brancher un fréquencemètre sur la broche d'essai "courant video" de l'ampli de tête.
- Ajuster la résistance 3018 pour que le fréquencemètre affiche 3.800 MHz \pm 10 kHz.

3. Fréquence du blanc (3020)

- Avant cet ajustage contrôler le point 1
- Brancher un générateur de mire et appliquer une mire à 100% de blanc.
- Mettre l'appareil au mode "record".
- Brancher un oscilloscope à la broche "video current" sur l'ampli de tête.
- Ajuster la résistance 3020 pour que le fréquencemètre affiche 4.600 MHz \pm 10 kHz.

4. Réglage du courant d'écriture

Veillez à faire simultanément la syntonisation de R3099 et R3096 !

a) Réglage du courant d'écriture de luminance (3099)

- Mettre l'appareil au mode "record".
- Brancher un oscilloscope à la broche "video current" de l'ampli de tête.
- Ne pas appliquer de signal (programme E1).
- Ajuster la résistance 3099 pour que l'amplitude du signal soit de 320 mVcc.

b) Réglage du courant d'écriture de chrominance (3096)

- Mettre l'appareil au mode "record".
- Brancher un oscilloscope à la broche "video current" de l'ampli de tête.
- Brancher un générateur de mire et appliquer un signal rouge sur l'Euroconnecteur (programme E1).
- Relier la broche 40 de l'IC7501 à +5V.
- Ajuster la résistance 3096 pour que l'amplitude du signal soit de 80mVcc (- 12 dB par rapport au signal de luminance).

5. Niveau luminance en lecture (3039)

- Passer une cassette avec une image à 100% de blanc.
- Brancher un oscilloscope au connecteur 2S11.
- Ajuster la résistance 3039 de manière que l'amplitude du signal de sortie atteigne 1.8 Vcc \pm 0.05Vcc.

NL AFREGELINGEN

1. E-E niveau (3010)

- Sluit een patroongenerator aan en voeg een 100% wit beeld toe aan de Euroconnector (programma E1).
- Recorder in positie "stop" plaatsen.
- Sluit een oscilloscoop aan pin 4 IC7501.
- Weerstand 3010 zodanig instellen, dat de amplitude van de uitgangsspanning 0.5 Vpp \pm 0.02 Vpp bedraagt.
- Controleer of de spanning aan de connector 2S11 1.9 Vpp \pm 0,1 Vpp bedraagt.

2. Sync-frequentie (3018)

- Recorder in "record" mode plaatsen.
- Geen signaal toevoeren (programma E1).
- Sluit een frequentieteller aan op de "video current testpin" op de kopversterker.
- Weerstand 3018 zodanig instellen, dat de frequentieteller 3.800 MHz \pm 10 kHz aangeeft.

3. Wit-frequentie (3020)

- Voor deze instelling punt 1 controleren
- Sluit een patroongenerator aan en voer een 100% wit beeld toe.
- Recorder in "record" mode plaatsen.
- Sluit een oscilloscoop aan op de "video current testpin" op de kopversterker.
- Weerstand 3020 zodanig instellen, dat de frequentieteller 4.600 MHz \pm 10 kHz.

4. Schrijfstroominstelling

R3099 en R3096 tegelijkertijd vereffenen !

a) Luminantie schrijfstroominstelling (3099)

- Recorder in "record" mode plaatsen.
- Sluit een oscilloscoop aan op de "video current testpin" op de kopversterker.
- Geen signaal toevoeren (programma E1).
- Weerstand 3099 zodanig instellen, dat de amplitude van het signaal 320 mVpp bedraagt.

b) Chrominantie-schrijfstroominstelling (3096)

- Recorder in "record" mode plaatsen.
- Sluit een oscilloscoop aan op de "video current testpin" op de kopversterker.
- Sluit een patroongenerator aan en voer een rood signaal toe aan de Euroconnector (programma E1).
- Verbind pin 40 van IC7501 met +5V.
- Weerstand 3096 zodanig instellen, dat de amplitude van het signaal 80 mVpp bedraagt (-12 dB ten opzichte van het luminantiesignaal).

5. Luminantie-playback-niveau (3039)

- Geef een op een cassette opgenomen 100% wit beeld weer.
- Sluit een oscilloscoop aan op connector 2S11.
- Weerstand 3039 zodanig instellen, dat de amplitude van het uitgangssignaal 1.8 Vpp \pm 0.05 Vpp bedraagt.

I REGOLAZIONI

1. Livello E-E (3010)

- Collegare un generatore di segnale applicare un'immagine completamente bianca al Euro-connettore (programma E1)
- Portare il registratore in posizione "STOP"
- Collegare un oscilloscopio al pin 4 IC7501
- Regolare il potenziometro 3010 in modo che l'ampiezza della tensione d'uscita sia 0,5 Vpp \pm 0,02 Vpp.
- Controllare se la tensione al connettore 2S11 sia 1,9 Vpp \pm 0,1 Vpp.

2. Frequenza di sincronizzazione (3018)

- Registratore in posizione di registrazione.
- Non applicare nessun segnale (programma E1).
- Collegare un contatore di frequenza al "testpin video current" nel preamplificatore testine.
- Regolare il potenziometro 3018 in modo che il contatore di frequenza indichi 3,800 MHz \pm 10 kHz.

3. Frequenza del bianco (3020)

- Prima di questa regolazione controllare il punto 1
- Collegare un generatore di segnale e applicare un'immagine completamente bianca.
- Portare l'apparecchio in posizione di registrazione.
- Collegare un frequenzimetro al "testpin video current" nel preamplificatore testine.
- Regolare il potenziometro 3020 in modo che il contatore di frequenza indichi 4,600 MHz \pm 10 kHz.

4. Corrente di registrazione

Eseguire insieme l'accorde di R3099 e di R3096

a) Regolazione della corrente di registrazione di luminanza (3099)

- Portare il registratore in posizione di registrazione.
- Collegare al "testpin video current" nel amplificatore testine un oscilloscopio.
- Non applicare nessun segnale (programma E1).
- Regolare il potenziometro 3099 in modo che l'ampiezza del segnale sia 320 mVpp.

b) Regolazione della corrente di registrazione di cromaticanza (3096)

- Portare il registratore in posizione di registrazione.
- Collegare l'oscilloscopio al "testpin video current" nel amplificatore testine.
- Collegare un generatore di segnale e applicare un segnale rosso al Euro-connettore (programma E1).
- Collegare il piedino 40 di IC7501 a +5V.
- Regolare il potenziometro 3096 in modo che l'ampiezza del segnale sia 80 mVpp (-12dB relativo al segnale di luminanza).

5. Luminanza Livello di riproduzione (3039)

- Riprodurre un'immagine completamente bianca registrata su cassetta.
- Collegare un oscilloscopio al connettore 2S11.
- Regolare il potenziometro 3039 in modo che l'ampiezza del segnale d'uscita sia 1,8 Vpp \pm 0,05 Vpp.

E AJUSTES

1. Nivel E-E (3010)

- Conecte un generador patrón y aporte una imagen blanca al conectorEURO (programa E1).
- Ponga el registrador en posición "stop"
- Conecte un osciloscopio al pin 4 IC7501.
- Ajuste la resistencia 3010 de manera que la amplitud de la tensión de salida sea 0,5 Vss \pm 0,02 Vss.
- Controlar si la tensión del conector 2S11 sea 1,9Vss \pm 0.1Vss

2. Frecuencia de sincronización (3018)

- Ponga el registrador en posición "record".
- No alimente ninguna señal (programa E1).
- Conecte un frecuencímetro al "video current testpin" en el amplificador de cabezales.
- Ajuste la frecuencia 3018 de manera que el frecuencímetro indique 3,800 MHz \pm 10 kHz.

3. Frecuencia blanca (3020)

- Antes de este ajuste controlar el punto 1
- Conecte un generador patrón y aporte una imagen blanca.
- Ponga el registrador en posición "record"
- Conecte un osciloscopio al "video current testpin" en el amplificador de cabezales.
- Ajuste la resistencia 3020 de manera que el frecuencímetro indique 4,600 MHz \pm 10 kHz.

4. Registrador de corriente

Acabar juntos los ajustes R3099 y R3096 !

a) Luminancia-ajuste del registrador de corriente (3099)

- Ponga el registrador en posición "record".
- Conecte un osciloscopio al "video current testpin" en el amplificador de cabezales.
- No alimente ninguna señal (programa E1).
- Ajuste la resistencia 3099 de manera que la amplitud de la señal sea 320 mVss.

b) Crominancia-ajuste del registrador de corriente (3096)

- Ponga el registrador en posición "record".
- Conecte un osciloscopio al "video current testpin" en el amplificador de cabezas.
- Conecte un generador patrón y aporte una señal roja al conector Euro (programa E1).
- Conecte la conexión 40 de IC7501 con +5V.
- Ajuste la resistencia 3096 de manera que la amplitud de señal sea 80 mVss (-12dB referido a la señal de luminancia).

5. Luminancia - nivel de reproducción (3039)

- Reproduzca una imagen blanca registrada en una casete.
- Conecte un osciloscopio al conector 2S11.
- Ajuste la resistencia 3039 de manera que la amplitud de la señal de salida sea 1,8 Vss \pm 0,05 Vss.

For WD code WD34 and higher

CONNECTORS

4822 290 60954	6-FOLD
4822 290 81463	7-FOLD
4822 321 22318	11-FOLD

MISCELLANEOUS

1601	4822 242 81067	4.433 619 MHz
1602	4822 071 55001	Fuse 500mA
1603	4822 320 40168	Delay line

CAPACITORS

2000	5322 122 32287	4,7 pF	50V
2001	5322 122 32269	68 pF	50V
2002	4822 126 10326	180 pF	
2003	4822 122 32575	220 pF	50V
2004	5322 122 32965	18 pF	50V
2006	4822 122 33177	10 nF	50V
2007	4822 122 33177	10 nF	50V
2009	4822 124 40435	10 μ F	50V
2010	5322 122 34123	1 nF	50V
2011	4822 124 40435	10 μ F	50V
2012	4822 124 42006	1 μ F	50V
2013	5322 122 32531	100 pF	50V
2014	5322 122 32452	47 pF	50V
2015	4822 122 33177	10 nF	50V
2016	4822 122 31947	100 nF	63V
2017	4822 126 10004	120 pF	63V
2018	5322 122 32531	100 pF	50V
2019	4822 126 10004	120 pF	63V
2020	5322 122 32269	6,8 pF	50V
2021	4822 124 41643	100 μ F	16V
2022	4822 124 41506	47 μ F	16V
2023	4822 124 22263	220 μ F	16V
2024	4822 124 41506	47 μ F	16V
2025	5322 122 32654	22 nF	63V
2026	5322 122 32531	100 pF	50V
2027	4822 122 33515	82 pF	63V
2028	4822 126 10004	120 pF	63V
2029	5322 122 32452	47 pF	50V
2031	4822 122 31947	100 nF	63V
2032	4822 124 40242	1 μ F	63V
2033	4822 126 10004	120 pF	63V
2034	5322 122 32654	22 nF	63V
2035	4822 124 40242	1 μ F	63V
2036	5322 122 34123	1 nF	50V
2038	5322 122 32966	39 pF	50V
2039	5322 122 31946	27 pF	50V
2040	4822 124 41506	47 μ F	16V
2041	4822 124 41506	47 μ F	16V
2042	4822 122 31947	100 nF	63V
2043	5322 122 32654	22 nF	63V
2045	4822 122 33177	10 nF	50V
2046	4822 124 40242	1 μ F	63V
2047	4822 124 40242	1 μ F	63V
2048	4822 122 32542	47 nF	63V
2050	5322 122 31946	27 pF	50V
2052	4822 124 40435	10 μ F	50V
2055	4822 122 31947	100 nF	63V
2056	4822 122 32542	47 nF	63V
2057	4822 122 32542	47 nF	63V
2058	4822 124 40242	1 μ F	63V
2059	4822 124 40242	1 μ F	63V
2060	5322 122 34123	1 nF	50V
2061	5322 122 34123	1 nF	50V
2062	4822 122 33177	10 nF	50V
2063	5322 122 34123	1 nF	50V

2064	4822 122 31947	100 nF	63V
2065	5322 122 32269	6,8 pF	50V
2066	5322 122 31946	27 pF	50V
2067	5322 122 32659	33 pF	50V
2068	5322 122 32269	6,8 pF	50V
2069	5322 122 31946	27 pF	50V
2070	5322 122 32269	6,8 pF	50V
2071	5322 122 32452	47 pF	50V
2072	5322 122 34123	1 nF	50V
2073	4822 124 40242	1 μ F	63V
2074	5322 122 34123	1 nF	50V
2075	4822 124 41643	100 μ F	16V
2076	5322 122 32452	47 pF	50V
2077	5322 122 34123	1 nF	50V
2078	5322 122 32654	22 nF	63V
2079	4822 122 33177	10 nF	50V
2080	5322 122 34123	1 nF	50V
2082	4822 124 41576	2,2 μ F	50V (only for SECAM)
2083	4822 124 41576	2,2 μ F	50V (only for SECAM)
2084	4822 124 41577	4,7 μ F	50V (only for SECAM)
2085	4822 124 41643	100 μ F	16V (only for SECAM)
2086	5322 122 34123	1 nF	50V (only for SECAM)
2087	5322 122 31863	330 pF	50V
2088	4822 122 31947	100 nF	63V
2089	4822 124 41506	47 μ F	16V
2090	4822 124 41506	47 μ F	16V (only for SECAM)
2091	4822 122 33177	10 nF	50V (only for SECAM)
2095	5322 122 32452	47 pF	50V
2096	5322 122 32452	47 pF	50V
2097	5322 122 32287	4,7 pF	50V
2101	4822 126 10004	120 pF	63V
2105	5322 122 32654	22 nF	63V

RESISTORS

3001	4822 051 20471	470 Ω	0,1W
3002	4822 051 20472	4,7 k Ω	0,1W
3003	4822 051 20472	4,7 k Ω	0,1W
3004	4822 051 20472	4,7 k Ω	0,1W
3005	4822 051 20472	4,7 k Ω	0,1W
3006	4822 051 10102	1 k Ω	0,25W
3007	4822 051 20479	47 Ω	0,1W
3008	4822 051 20223	22 k Ω	0,1W
3009	4822 051 20103	10 k Ω	0,1W
3010	4822 100 11842	4,7 k Ω	
3011	4822 051 20183	18 k Ω	0,1W
3012	4822 051 20333	33 k Ω	0,1W
3016	4822 051 20223	22 k Ω	0,1W
3017	4822 051 20103	10 k Ω	0,1W
3018	4822 100 11842	4,7 k Ω	
3019	4822 051 20562	5,6 k Ω	0,1W
3020	4822 100 11842	4,7 k Ω	
3021	4822 051 20912	9,1 k Ω	0,1W
3022	4822 051 20222	2,2 k Ω	0,1W
3023	4822 051 10102	1 k Ω	0,25W
3025	4822 051 20104	100 k Ω	0,1W
3026	4822 051 20472	4,7 k Ω	0,1W
3027	4822 051 20681	680 Ω	0,1W
3028	4822 051 20682	6,8 k Ω	0,1W
3029	4822 051 20472	4,7 k Ω	0,1W
3030	4822 051 20222	2,2 k Ω	0,1W
3031	4822 051 20333	33 k Ω	0,1W
3032	4822 051 20333	33 k Ω	0,1W
3033	4822 051 10102	1 k Ω	0,25W
3034	4822 051 20222	2,2 k Ω	0,1W
3036	4822 051 20472	4,7 k Ω	0,1W
3037	4822 051 20152	1,5 k Ω	0,1W
3038	4822 051 20472	4,7 k Ω	0,1W
3039	4822 100 11843	10 k Ω	

Signal panel PMS51/01/02

For WD code WD34 and higher

3040	4822 051 20222	2,2 kΩ	0,1W
3041	4822 051 20472	4,7 kΩ	0,1W
3042	4822 051 10102	1 kΩ	0,25W
3043	4822 051 20561	560 Ω	0,1W
3044	4822 051 10102	1 kΩ	0,25W
3045	4822 051 20472	4,7 kΩ	0,1W
3046	4822 051 20222	2,2 kΩ	0,1W
3047	4822 051 20473	47 kΩ	0,1W
3048	4822 051 20473	47 kΩ	0,1W
3051	4822 051 20105	1 MΩ	0,1W
3052	4822 051 20822	8,2 kΩ	0,1W
3053	4822 051 20222	2,2 kΩ	0,1W
3055	4822 051 20152	1,5 kΩ	0,1W
3056	4822 051 20471	470 Ω	0,1W
3060	4822 051 20333	33 kΩ	0,1W
3061	4822 051 20103	10 kΩ	0,1W
3062	4822 051 20182	1,8 kΩ	0,1W
3063	4822 051 20271	270 Ω	0,1W
3064	4822 051 20561	560 Ω	0,1W
3065	4822 051 10102	1 kΩ	0,25W
3066	4822 051 20122	1,2 kΩ	0,1W
3067	4822 051 20391	390 Ω	0,1W
3068	4822 051 10102	1 kΩ	0,25W
3069	4822 051 20561	560 Ω	0,1W
3070	4822 051 20391	390 Ω	0,1W
3071	4822 051 20681	680 Ω	0,1W
3072	4822 051 20271	270 Ω	0,1W
3073	4822 051 10102	1 kΩ	0,25W
3075	4822 051 20471	470 Ω	0,1W
3076	4822 051 20331	330 Ω	0,1W
3077	4822 051 20183	18 kΩ	0,1W
3078	4822 051 20183	18 kΩ	0,1W
3079	4822 051 20473	47 kΩ	0,1W
3080	4822 051 20101	100 Ω	0,1W
3081	4822 051 20101	100 Ω	0,1W
3082	4822 051 20472	4,7 kΩ	0,1W
3083	4822 051 20103	10 kΩ	0,1W
3084	4822 051 20182	1,8 kΩ	0,1W
3085	4822 051 20223	22 kΩ	0,1W (only for SECAM)
3086	4822 051 20821	820 Ω	0,1W (only for SECAM)
3087	4822 051 20105	1 MΩ	0,1W (only for SECAM)
3088	4822 051 20223	22 kΩ	0,1W (only for SECAM)
3089	4822 051 10102	1 kΩ	0,25W
3090	4822 051 10102	1 kΩ	0,25W
3091	4822 051 20562	5,6 kΩ	0,1W
3092	4822 051 20332	3,3 kΩ	0,1W
3093	4822 051 20152	1,5 kΩ	0,1W
3094	4822 051 20222	2,2 kΩ	0,1W
3096	4822 100 11842	4,7 kΩ	
3097	4822 051 20222	2,2 kΩ	0,1W
3098	4822 051 20471	470 Ω	0,1W
3099	4822 100 11841	1 kΩ	
3104	4822 051 20472	4,7 kΩ	0,1W
3105	4822 051 10102	1 kΩ	0,25W
3106	4822 051 20271	270 Ω	0,1W
3107	4822 051 20472	4,7 kΩ	0,1W
3109	4822 051 20561	560 Ω	0,1W
3111	4822 051 20471	470 Ω	0,1W
3112	4822 051 20222	2,2 kΩ	0,1W
3113	4822 051 20104	100 kΩ	0,1W
3114	4822 051 20333	33 kΩ	0,1W
3117	4822 051 20183	18 kΩ	0,1W
3118	4822 051 10102	1 kΩ	0,25W
3119	4822 051 20101	100 Ω	0,1W
3120	4822 051 20333	33 kΩ	0,1W
3121	4822 051 10102	1 kΩ	0,25W (only for SECAM)
3122	4822 051 10102	1 kΩ	0,25W
3127	4822 051 20821	820 Ω	0,1W
3128	4822 051 20223	22 kΩ	0,1W
3129	4822 051 10102	1 kΩ	0,25W

3130	4822 051 20331	330 Ω	0,1W
3131	4822 051 10102	1 kΩ	0,25W
3132	4822 051 20681	680 Ω	0,1W
3135	4822 051 20104	100 kΩ	0,1W
39xx	4822 051 10008	0 Ω	Jumper

COILS

5002	4822 157 53253	27 μH
5003	4822 157 53265	100 μH
5004	4822 157 52842	15 μH
5006	4822 157 53251	8,2 μH
5007	4822 157 52842	15 μH
5008	4822 157 53251	8,2 μH
5009	4822 157 52842	15 μH
5010	4822 157 53253	27 μH
5011	4822 157 52842	15 μH
5012	4822 157 53265	100 μH
5013	4822 157 52842	15 μH
5014	4822 157 53251	8,2 μH
5015	4822 157 63676	56 μH
5016	4822 157 53253	27 μH
5017	4822 157 63676	56 μH
5020	4822 157 52842	15 μH
5021	4822 157 52842	15 μH
5022	4822 157 52842	15 μH
5023	4822 157 63675	330 μH
5024	4822 157 63678	560 μH
5025	4822 157 53253	27 μH

DIODES

6002	4822 130 31983	BAT85
6003	4822 130 30621	1N4148
6005	4822 130 30621	1N4148

TRANSISTORS & IC's

7000	5322 130 41983	BC858B
7003	5322 130 41982	BC848B
7004	5322 130 41983	BC858B
7005	5322 130 41982	BC848B
7006	5322 130 41983	BC858B
7007	5322 130 41982	BC848B
7008	5322 130 41982	BC848B
7010	4822 130 60145	DTC124EK
7011	5322 130 41983	BC858B
7012	5322 130 41982	BC848B
7015	5322 130 41982	BC848B
7016	5322 130 41982	BC848B
7017	4822 130 42353	BSF19-F2
7018	4822 130 60383	BF824
7019	4822 130 42353	BSF19-F2
7022	5322 130 41983	BC858B
7023	5322 130 41983	BC858B
7025	5322 130 41982	BC848B
7026	5322 130 41982	BC848B
7027	5322 130 41982	BC848B
7029	5322 130 41982	BC848B
7030	4822 130 42353	BSF19-F2
7031	5322 130 41982	BC848B
7032	5322 130 41982	BC848B
7036	5322 130 41982	BC848B
7038	5322 130 41983	BC858B
7501	4822 209 30691	LA7391A
7503	4822 209 60177	LM339M
7504	4822 209 30692	MSM7403RS
7505	4822 209 60376	LA7311
7506	4822 209 60822	AN3319S